

Near Real-Time Aircraft Noise Monitoring Tool for UAM e-VTOL Aircraft, Phase I

Completed Technology Project (2018 - 2019)



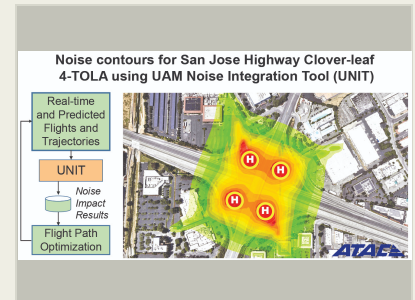
Project Introduction

The proposed SBIR develops a near real-time aircraft noise monitoring tool called UAM Noise Integration Tool (UNIT) for e-VTOL aircraft that is capable of being integrated within the real-time NASA ATM-X Testbed environment. It is highly relevant to the NASA 2018 SBIR Focus Area 20, Subtopic A3.01 Advanced Air Traffic Management Systems Concepts, since it addresses the area of “achieving high efficiency in using aircraft, airports, enroute and terminal airspace resources, while accommodating an increasing variety of missions and vehicle types, including wide-spread integration of UAS and ODM operations” because noise can be a greatly limiting factor in determining efficiencies, due to the expected high frequency of ODM operations and the potential noise impacts on communities. Specifically, it is relevant to the RFP area of “concepts of emergent risks” because increased noise impacts are a risk to the system, and public backlash to ODM and e-VTOL noise impacts can thwart the concept and technology before it launches. There are three parts to the innovation: (1) the ability to calculate in near real-time the noise impacts at any location using both real-time and predicted flight operations and trajectories, (2) the ability to model the noise of conceptual e-VTOL aircraft, and (3) the development of people-focused noise metrics that consider the movement of people throughout the day. NASA’s Parimal Kopardekar, has stated on more than one occasion that noise is one of the top three challenges for UAM. UNIT provides noise results within a real-time environment to be used as input parameters into flight path optimization algorithms to minimize population noise impacts, thereby increasing public acceptance of UAM. This capability is important because communities are highly sensitive to noise and have blocked change when they believe their rights have been inadequately addressed

Anticipated Benefits

The ATM-X Testbed sub-project can leverage our integrated UNIT software with the real-time Testbed simulations to analyze the environmental impacts of future UAM e-VTOL scenarios, as well as non-UAM scenarios and conventional fixed-wing and rotary-wing air traffic operations. Our UNIT software can support planned UAM flight demonstrations and tests for the ATM-X Initial UAM Ops Integration sub-project, and can support future noise-sensitive route optimization algorithm development.

UNIT can (1) replace physical noise monitors with modeled receptors using near real-time radar flight trajectories to provide noise values at virtual receptors on the ground, (2) provide near instant feedback on potential environmental impact changes to improve designs for ANSP airspace redesign processes, (3) support low noise e-VTOL aircraft design processes, and (4) enable noise-sensitive flight path planning for UAM service providers.



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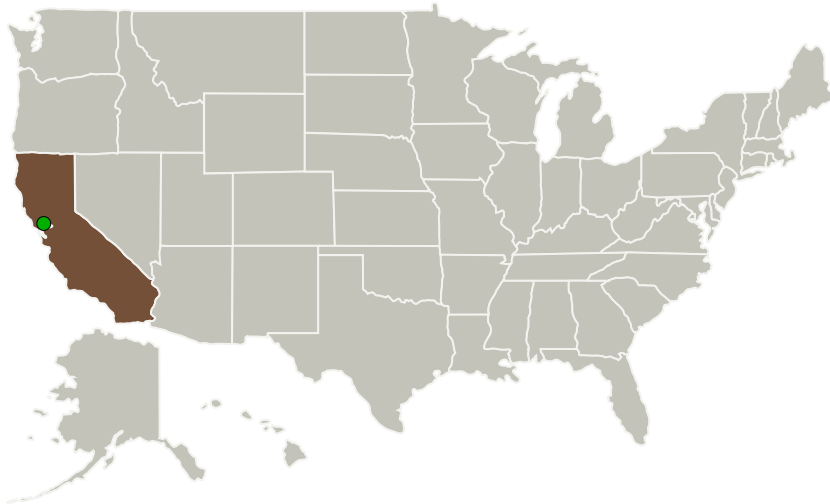
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ATAC	Lead Organization	Industry	Santa Clara, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California

Project Transitions

**July 2018:** Project Start**February 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137872>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ATAC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

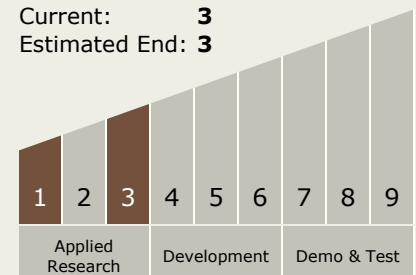
Carlos Torrez

Principal Investigator:

Ray Bea

Technology Maturity (TRL)

Start: **1**
 Current: **3**
 Estimated End: **3**



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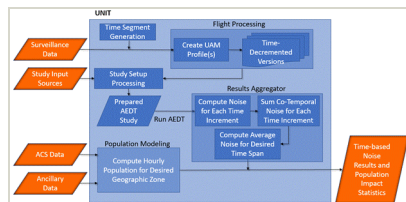


Images



Briefing Chart Image

Near Real-Time Aircraft Noise Monitoring Tool for UAM e-VTOL Aircraft, Phase I
(<https://techport.nasa.gov/image/137127>)



Final Summary Chart Image

Near Real-Time Aircraft Noise Monitoring Tool for UAM e-VTOL Aircraft, Phase I
(<https://techport.nasa.gov/image/134649>)

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - TX15.1 Aerosciences
 - TX15.1.4 Aeroacoustics

Target Destination

Earth